

ASSESSMENT OF THE HEALTHY NEWBORN BABY

FACT FILE 2E (a)

The specific anatomy and physiology of the neonate differs in many ways from that of an older child or adult. It is important to understand these specific differences in order to be able to assess 'norms' and so recognise, if applicable, any deviations that may necessitate referral and intervention. This Fact file now turns to neonatal biology in relation to the *assessment* of behaviour and appearance (e.g. musculo-skeletal and skin) and normal parameters starting with assessment at birth.



© Maryanne Gobble | Dreamstime.com

Assessment at birth: According to the Resuscitation Council UK, a healthy baby will be born blue but will have good tone, will cry within a few seconds of delivery and will have a good heart rate over 100/minute within a few minutes of birth (the heart rate of a healthy newborn baby is about 120-150 min) (Resus Council, 2010). Traditionally, assessing colour, tone, breathing effort, heart rate and response to stimulation made up the 'Apgar scoring system' where a newborn was scored 0-2 on each of these criteria. Now, although 'scores' continue to be routinely recorded in the birth details and documentation for 1,5 and 10 minutes, it is more important to think about these areas holistically in relation to whether the baby is breathing with a good heart rate, is toned, responsive and has an adequate colour; all indicating successful transition to extra-uterine life.

Examination / Observation of the Newborn: Following delivery and the initial assessment, general observation should be done regularly (e.g. when undressing / dressing, changing nappy, bathing, start of the shift, at least daily) by health professionals and / or parents, to ensure the neonate continues to be well and comfortable. Again colour, skin appearance, tone, movement, posture and behaviours can all be noted. Assessment can also be done more formally by systematic examination. After a baby is born an initial physical examination should be carried out ideally within the first 24 hours, and certainly within 72 hours of birth. This is to detect conditions that may need early treatment. It is repeated at the end of the postnatal period. Certain observable features on examination do not warrant any treatment and just require observation.

Specific Systems

1) Behavioural System



Term neonates demonstrate distinct behavioural states from birth; namely; deep sleep, light sleep, 'fussiness', awake /alert and crying/active. They are able to 'habituate' to external stimuli in that they are able to close down their central nervous system enough to shut out any excessive stimuli; This is also known as state regulation or self-consoling where the limbs are tightly flexed with little movement. The neonate may display hand-to-mouth action, a common consoling measure. Stimulation should take place when the neonate is in a quiet, alert state.

The preterm neonate's sensory, pain and behavioural systems are immature and behaviours may not follow the usual expected patterns as seen in the term neonate.

2) Musculoskeletal System



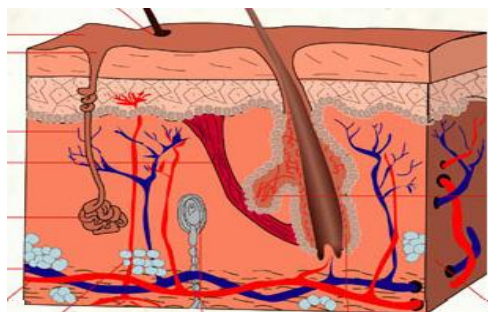
© Tracy0703 | Dreamstime.com

Physiological flexion occurs at approximately 34 weeks gestation when the fetus has developed good muscular tone. At this time, they are positioned with arms and legs tucked up in a flexed, mid-line position, the characteristic posture of a healthy term neonate following delivery. Good tone should be present in all muscles. The hip joints should show adequate movement by both abduction and adduction as they should have developed fully within the pelvic bone.

The preterm neonate born before 34 weeks gestation has reduced tone and shows an extended posture with limbs lying straight and flat.

3) Integumentary System (skin)

<http://commons.wikimedia.org/>



The term neonate's skin should be fully developed, intact, clear and smooth. From birth, it has a well-developed stratum corneum complete with keratin formation. Vernix caseosa is often seen made up of fatty secretions from fetal sebaceous glands and dead epidermis cells forming a protective layer to the skin.

In a healthy neonate the skin should feel centrally warm and show adequate perfusion with good colour of both the skin and mucous membranes.

Newborn skin can be sensitive to external agents and therefore rashes can be commonplace – these however, do not usually cause a problem or require treatment; for example, milia, erythema toxicum and Mongolian blue spots.

The normal skin Ph is 6.4 which drops to approximately 5.5 in the first month of life. This 'acid mantle' serves as natural protection against infection; ideally this should not be eliminated by the use of early or regular bathing with alkaline products. The latter can also lead to delayed separation of the umbilical cord due to the delay in normal skin flora colonisation. The cord stump and surrounding skin should look clean and dry and should separate after approximately 7-10 days of life.

The preterm neonates skins may lack keratin, the water proofing layer, and so can lose both heat and water via evaporation particularly at very early gestations. In addition, lack of collagen means that their skin is fragile, transparent and easily damaged. Very preterm neonates will also exhibit characteristic signs of immature gestation such as flat nipple, reduced / absent palmar and plantar creases, soft pinna of the ear lacking cartilage and lanugo hair is visible at around 24-28 weeks gestation up to weeks 32 and then starts to diminish towards the latter part of the last trimester.

4) Physiological parameters

Neonates exhibit specific vital signs in the following range of parameters related to their specific anatomy and physiology as compared to older age groups. See Table 1 for Summary. All values are averages & should serve as a guideline. Individual differences / variations always apply. (Adapted from sources: Hockenberry and Wilson, 2006; Tappero and Honeyfield, 2010).

Pointers for assessing the clinical appearance and observations of the neonate can be seen in Table 2. This can serve as a guide for taking over the care of a neonate at the start of a shift and focuses on nursing assessment.



© Typhoonski | Dreamstime.com

To summarise, a healthy term neonate should remain an adequate colour, feel warm with good muscle tone and normal posture. They will be able to move spontaneously and rigorously, should respond to stimulation (e.g. touch), normal reflexes should be elicited and they should cycle through sleep, awake, alert and quiet states waking for feeds when hungry and settling again afterwards. They should be able to feed successfully and regularly pass urine and stool and increase weight after their birth weight has been regained. Variations exist between neonates in relation to many aspects; such as feeding patterns, sleep patterns and consolability.

Family Assessment: As part of our overall assessment of the neonate, this should include consideration of family needs, wishes and anxieties as well as observation of how the family interacts, visits and the identification, if applicable, of any social / psycho-emotional issues. An important part of this assessment is the cultural and religious observations that need to be taken into account for the neonate's care planning. Care should always be family centred and culturally sensitive and therefore should be incorporated into any initial and ongoing assessment of the neonate.



TABLE 1
COMPARATIVE PARAMETER RANGES IN THE NEONATE, CHILD & ADULT

<u>NORMAL HEART RATES</u>		
<u>AGE</u>	<u>AWAKE</u>	<u>SLEEPING</u>
NEONATE (PRETERM)	100-200/minute	120-180
NEONATE (TERM)	100-180	80-160
INFANT	100-160	75-160
TODDLER	80-110	60-90
PRESCHOOLER	70-110	60-90
SCHOOL	65-110	60-90

<u>NORMAL BLOOD PRESSURE</u>		
<u>AGE</u>	<u>SYSTOLIC</u>	<u>DIASTOLIC</u>
BIRTH (12HR, <1KG)	39-59	16-36
BIRTH (12 HR, 3KG)	50-70	24-45
NEONATE (96 HR)	60-90	20-60
INFANT (6 MONTH)	87-105	53-66
TODDLER (2 YEAR)	95-105	53-66
SCHOOL AGE	97-112	57-71
ADULT	112-128	66-80

Usually, the mean arterial blood pressure should equate with weeks in gestation

<u>NORMAL RESPIRATORY RATES</u>	
PRETERM	40 – 80 BPM
TERM NEONATES	30 – 70
INFANTS	30 – 60
TODDLERS	24 – 40
PRESCHOOL	22 – 34
SCHOOL/ADULT	18 – 30

<u>TEMPERATURE</u>	
CENTRAL (AXILLA)	36.6 – 37.2 degrees Celsius
PERIPHERAL	34.6 – 36.2
(I.e. core-toe temperature difference should be no more than 2 degrees Celsius and greater than 1 degree difference)	

<u>PERFUSION</u>	
CAPILLARY REFILL	2 seconds
URINE OUTPUT	minimum of 1 ml / kg hour

<u>CIRCULATING BLOOD VOLUMES</u>	
NEONATES	80-90 MLS / KG (
INFANTS	75-80
CHILDREN	70-75
ADULTS	65-70

<u>TIDAL VOLUMES</u>	
NEONATES	4-6 MLS / KG
CHILDREN	6- 10 MLS / KG

<u>GLUCOSE</u>	
> 2.6MMOLS in the at-risk / sick neonate	
4-6 mmols in the older neonate / child	

TABLE 2: ALL SYSTEMS CLINICAL ASSESSMENT GUIDE

<u>SYSTEM</u>	<u>Normal</u>
<u>Respiratory</u>	<u>Non-ventilated</u> Effortless breathing, periodic, rate, 30-60, bilateral chest movement, pink in colour, quiet chest sounds
<u>Cardiovascular</u>	Adequate MBP, capillary refill less than 2 seconds, urine output at least 1ml/kg/hour, pink in colour, warm skin, toe-core temperature difference 1-2 degrees Celsius, palpable pulses, adequate heart rate
<u>Fluid status and balance</u>	Adequate systemic perfusion and urine output (see above), normal fontanelles, palpable peripheral pulses, good skin turgor, normal sodium level, specific gravity of urine 1.010 – 1.020, weight gain appropriate for age, equal fluid balance (in and out) for 24 hr balance
<u>Gastro-intestinal</u>	Soft, non-tender abdomen, bowel sounds, nil/minimal aspirate from stomach which is clear and mucousy, bowels open and normal stool, no vomiting, tolerance of feeds if applicable, blood sugar > 2.6 mmols.
<u>Neurological</u> (includes pain/stress)	<u>Consider:</u> <ol style="list-style-type: none"> 1. tone 2. movement 3. response to stimuli 4. level of consciousness Normal flexed posture (term) or extended limbs (if preterm), normal/present reflexes according to gestation and age, reactions to stimuli as appropriate to gestation, normal tone and movements, no presence of pain or stress (i.e. behaviour). Cues such as facial expression, excessive movements, tone changes, vital signs, adequate sedation.
<u>Thermoregulation</u>	Normal body temperature for age and appropriate environmental temperature, if on 'servo', normal temperature range for abdominal probe.
<u>Skin and general appearance</u>	Normal skin for gestation, e.g.: frail and red in the preterm, and well formed in term, pink mucous membranes, no excoriation, no signs of jaundice, umbilical area clean, I.V. sites healthy

KEY READING

STANFORD WEBSITE.... PHOTO GALLERY (STANFORD NEWBORN NURSERY WEBSITE) – INDEX of all body systems with normal and abnormal assessment (images, text, video and audio)

PLUS ALL OTHER SYSTEMS – NORMAL ASSESSMENT (Click on each body system)

<http://newborns.stanford.edu/PhotoGallery/General.html>

PATIENT.CO.UK WEBSITE – EXAMINATION OF THE NEWBORN – NORMAL AND ABNORMAL

<http://www.patient.co.uk/doctor/Examination-of-the-Neonate.htm>

VIDEO OF EXAMINATION OF THE NEWBORN

<http://embarrassingbodieskids.channel4.com/video/in-detail/new-born-baby-checks/>

CARDIAC ASSESSMENT

<http://www.medscape.com/viewarticle/722428>

CONDITIONS.....

<http://www.patient.co.uk/doctor/Erythema-Toxicum-Neonatorum.htm>

Ballard JL (2010) <http://www.ballardscore.com>

Resuscitation Council NLS Guidelines (2010) <http://www.resus.org.uk/pages/nls.pdf>

Baston H and Durward H (2010) Examination of the Newborn – A Practical Guide (2nd Edition) Routledge, London

Davies L and McDonald S (2008) Examination of the Newborn and Neonatal Health: A Multidimensional Approach: London; Churchill Livingstone

Hazinski (1992) Nursing Care of the Critically Ill Child New York, Mosby year Book

Hockenberry, M. J. and Wilson, D. (2006) Wong's Nursing Care of Infants and Children. 8th ed. St Louis: Mosby.

Kanneh A and Davies F (2000) Physical characteristics and physiological features of the full term neonate: Theory practice integration – Part 1 Journal of Neonatal Nursing, 6,1, 4-8

Kanneh A and Davies F (2000) Physical features of the full-term neonate: Theory practice integration – Part 2 Journal of Neonatal Nursing, 6,2, 49-54

Lomax A (2011) (ed) Examination of the Newborn; An Evidence Based Guide Wiley Blackwell; Oxford

MacGregor J (2008) Introduction to the Anatomy and Physiology of Children: A Guide for Students of Nursing, Child Care and Health London; Routledge

Nicholson L (2007) Caput Succedaneum and Cephalohematoma; The Cs that leave bumps on the head Neonatal Network 26, 5, 277-281

Petty.J. (2010) Normal Postnatal Adaptation to extra-uterine life Part b- Thermoregulation and glucose homeostasis Journal of Neonatal Nursing 16 (5)

Rennie J and Robertson NRC (2002) A Manual of Normal Intensive Care 4th edition London, Edward Arnold

Tappero EP and Honeyfield ME (2010) Physical assessment of the Newborn – a comprehensive approach to the art of physical examination 4th edition NICU- INK, CA

UK National Screening Committee (2008) Newborn and Infant Physical Examination: Standards and Competencies NSC; London
www.nsc.nhs.uk/ch_screen/child_ind.htm

